Fall 9-1-2001

# FOR 460.01: Range Inventory and Analysis

Unknown
*University of Montana - Missoula*

# RANGE INVENTORY AND ANALYSIS

The major objective of this course is to introduce methods and techniques used to describe rangelands. Rangeland is a kind of land characterized by native vegetation (climax or natural potential) which is predominately grass, grasslike plants, forbs, or shrubs suitable for grazing and/or browsing. Rangeland includes natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows. The study of range management is a study of the relations between cause and effect. Attention is focused upon the habitat as the cause and the plant or plant community as the effect. Because the plant in turn modifies the habitat, the plant may also be looked upon as a cause and the habitat through reactions, as an effect.

Therefore, anyone in range management should have a thorough understanding of habitat measurements. The methods that we are most interested in are both quantitative and qualitative measurements of the rangeland. For methods and techniques of measuring rangeland attributes, the range manager and researcher has drawn heavily from several other fields of specialization such as botany, plant ecology, animal science, and plant physiology. In any inventory of a site there may be several techniques used to describe the attributes of the vegetation. We will discuss problems inherent in analysis of rangelands, possible methods used to describe rangelands, and the advantages and disadvantages of some of the methods.

The quantitative features of plants or plant communities that can be most readily measured are: 1) weight or biomass 2) cover or area, 3) numbers, and 4) height or length or diameter. Weight, cover and number are the measurements used most by range ecologist. These quantitative measurements make it possible to assess: 1) Vegetation changes due to time and/or treatments applied; 2) Define plant communities; and, 3) To permit ecological comparisons.

Measurements of the quality of the vegetation most often of interest to the range managers are those making possible evaluation of the quality of forage produced or its value to animals. These are 1) preference of forage species to grazing animals, 2) nutrient content, and 3) digestibility.

**GRADING:**

Grades will be based on three lecture tests and laboratory exercises.

Lecture tests. The 2 lecture tests and the final exam will constitute 70 % of your final grade. The final exam will be comprehensive.

Laboratory. Laboratory scores will be graded on participation and understanding of the exercise. Laboratory exercises turned in late will be penalized 10 % per day. The laboratory will constitute 30 % of your final grade.

**NO REQUIRED TEXT:**

**SUPPLEMENTAL TEXT (On reserve at library):**

Bonham, Charles D. 1989. Measurements For Terrestrial Vegetation. John Wiley and Sons, New York. 338 p.

*Cook, C.W. and J. Stubbendieck (eds). 1986. Range Research: Basic Problems and Techniques. Soc. for Range Management. Denver, CO. 317 p.

* No longer in print.



## INTEGRATED RANGELAND RESOURCES MEASUREMENTS

I. INTRODUCTION

A. Rangelands, their value and integration with other ecosystems
B. The increasing complexity of ecosystem management

II. The foundation of ecosystems: Assessment of Climate, Soils, Physiography

III. Methods of Studying Vegetation (from *Sampling Vegetation Attributes* and Utilization Studies and *Residual Measurements*)

A. Quantitative Features
    1. Cover
    2. Numbers (density, frequency, and abundance)
    3. Weight (production and productivity)
    4. Height/Length
    5. Utilization
    6. Species diversity

B. Qualitative Features
    1. Preference
    2. Digestibility
    3. Nutrient content

IV. Sampling Range Vegetation

A. Purpose of Sampling
B. Populations, parameters, and statistics

V. Statistical Methods

A. Comparison of samples using interval estimates
B. Hypothesis testing
    1. T-test
    2. F-test

V. Plot shape, size and number

VI. Habitat Descriptions and Classifications

A. Range sites and ecological sites
B. Habitat types
C. Community types and Riparian types
D. Range condition and trend
F. Non-equilibrium theory

VII. Habitat Monitoring

VIII. Decision Support Systems

IX. Use of ARCVIEW in Rangeland Analyses